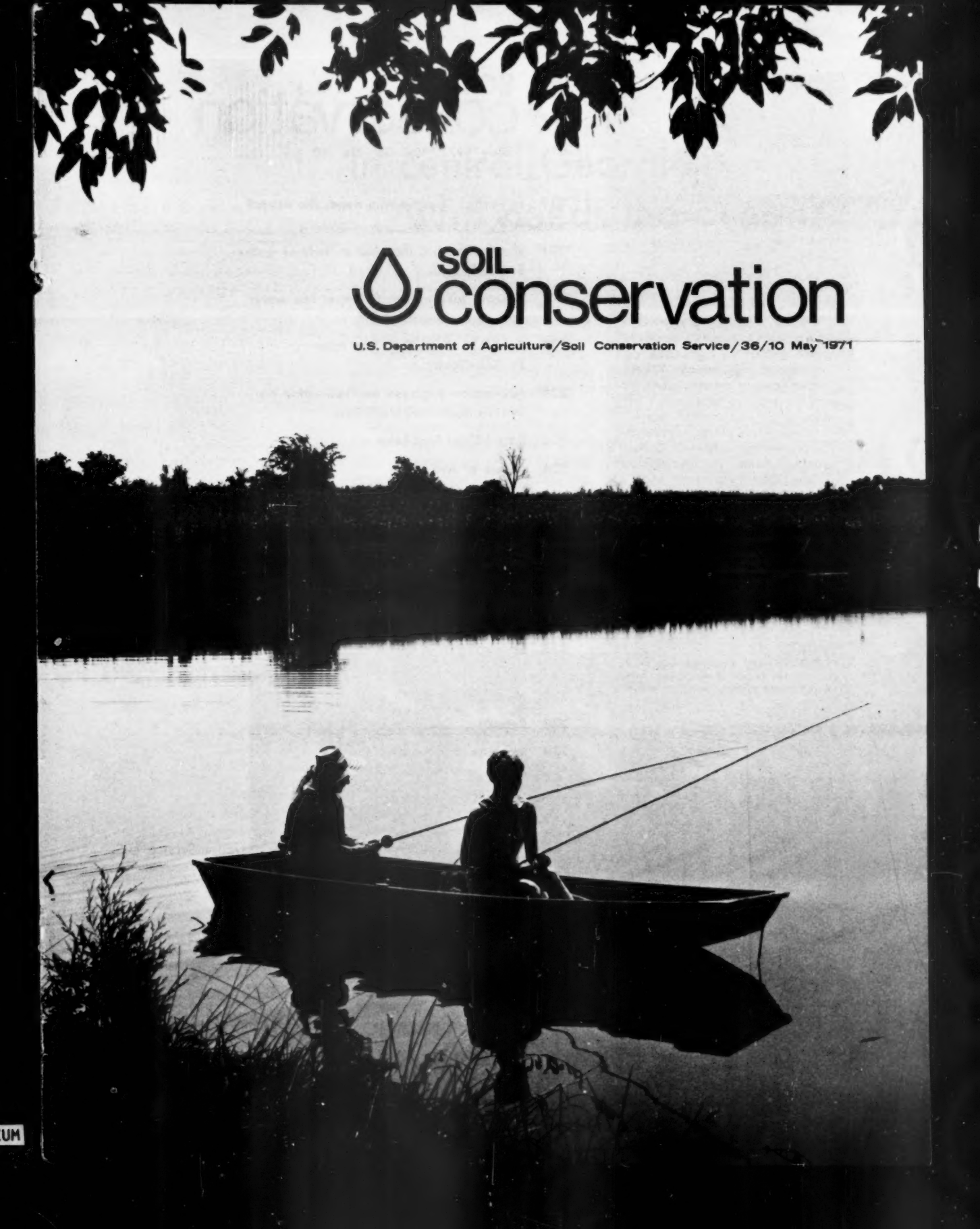

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Water, water everywhere—but having enough at the right place and at the right time is a problem in most areas. Where streamflow, or natural lakes, or wells and springs are not enough to supplement rainfall to meet man's needs, manmade lakes are the answer. Called ponds, dams, reservoirs, or lakes, they help meet man's water needs across the Nation. This month, several articles tell how landowners and townspeople brought manmade lakes to their communities and how the water changed their lives.

COVER: A pond adds new enjoyment to a family farm—Gibson County Soil Conservation District, Tenn.

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In central Georgia who needs the ocean?

By R. C. Robison
State conservation engineer, SCS, Athens, Ga.

Today, swimming, boating, fishing, and lakeside picnicking are only 30 minutes away from home for the several thousand people in central Georgia. Five years ago, getting to water meant a 3-hour drive.

Water-based recreation in the interior of the state had been scant until the combined efforts of many groups and agencies at local, state, and federal levels brought about Lake Tobesofkee, a 1,750-acre body of water just west of Macon.

Lake Tobesofkee is part of a Public Law 566 watershed project. It was formed by constructing a dam on Tobesofkee Creek, a sluggish Piedmont stream that flows into the Ocmulgee River just below Macon. The lake is about 5 miles long and has 34 miles of shoreline.

A firm of consulting engineers from Atlanta contracted with the Soil Conservation Service for design of the dam. The dam was completed in 1966.

Many of the hills surrounding the lake are covered with pine and have real promise for recreation development. Bibb County Commissioners and SCS joined forces to develop basic recreation facilities in the lake area. SCS gave technical assistance to the Macon architects and engi-

Lake Tobesofkee covers 1,750 acres and stores 25,000 acre-feet of water. Boat launching ramps are in the upper center. (Photograph courtesy of Georgia Forestry Commission)

neering firms that planned the facilities under contracts negotiated with the county.

Four recreation areas were planned for the lower half of the lake. Of these, three have been completed and are in operation. A fifth area is to be integrated later into the upper reaches of the lake.

In the completed recreation areas there are camping facilities for tents and trailers, picnic tables and shelters, hiking trails, and boat launching ramps. Roads are paved. Other facilities include bathrooms with showers and washers and dryers. Water and sewer lines are placed carefully to avoid pollution.

All permanent structures are of concrete and blend into their surroundings; they are designed for long life with low maintenance needs.

The lower end of Lake Tobesofkee is deep and excellent for boating and fishing. There are swimming beaches in three of the recreation parks. The upper part of the lake, an area of about 500 acres, is shallow. It is excellent for fishing and as habitat for many types of waterfowl. The county excavated a large area of shallow water in the upper part to a minimum depth of 3 feet. The spoil from this excavation was used to build earthen fishing piers, which allow maximum access to the water for those who do not have a boat.

The outlet structure that controls Lake Tobesofkee is one of a kind in the eastern United States. There are only about five such structures in North America. The structure was designed by a San Francisco engineering firm. It consists of two 40′ x 40′ delicately balanced steel gates. If the water level in the lake rises because of floodwater, the gates lift and excess water passes under them and on downstream.

This type of outlet structure was chosen over more conventional types for two reasons. First, it cost slightly less than a massive concrete structure. Second, it is safer for users of the lake. On many lakes, the spillway is designed to allow water to pass over the top of a concrete dam; boaters can be swept over this type of structure if they venture too close to it. This cannot happen on Lake Tobesofkee because the water moves under the gates.

The Tobesofkee Creek Watershed Project includes two other floodwater-retarding structures upstream. They, and a land-treatment program throughout the watershed, prevent large amounts of sediment from destroying the usefulness of Lake Tobesofkee.

Besides providing the central Georgia area with water-based recreation, Lake Tobesofkee is storing 25,000 acre-feet of water; 3,500 of this is for industrial use downstream.

The sponsors of this watershed project are the Towalgia and Ocmulgee soil and water conservation districts, Bibb County Commissioners, Georgia Rural Roads Authority, and Georgia Game and Fish Commission, which plans to locate its district headquarters on the shores of Lake Tobesofkee.

The Georgia Highway Department assisted with cost-sharing and supervised construction of three bridges over arms of the lake on roads that had to be relocated or altered because of the lake.

Bibb County is responsible for operation and maintenance of Lake Tobesofkee, including the recreation areas.

The Tobesofkee Creek Watershed Project has been a real asset to central Georgia. And the multiple-purpose aspects of Lake Tobesofkee have added much to the economic strength of Bibb County. About 209,000 people used the lake's recreation facilities between July 1, 1969, and June 20, 1970, and it is estimated that more than half a million people will visit the lake in fiscal 1972. ♦

By Bill Owen
Soil conservationist, SCS, Hubbard, Tex.

A pond is more than just a body of water

A big mallard flying in from the north banked slowly and began his descent to the water below. Trailing him in the gray autumn sky were several flocks of redheads, mergansers, and pintails. The water below was already dotted with early arrivals.

This rest stop for migrating ducks and geese is not a wildlife sanctuary. And it is not a hunting preserve. The water is in 15 ponds on the 4,000-acre Elmer Porter ranch near Hubbard, Tex. Elmer Porter plans his ponds for grazing distribution. But tell that to the ducks and geese.

"This is a cattle ranch," Porter said, "but I get particular satisfaction in seeing my livestock ponds used by ducks and geese. This is something I didn't consider when I developed my first conservation plan with the Soil Conservation Service in 1950."

"You just can't get proper use of all your pastures unless you have well-located ponds," Porter adds, "and the more ponds you have, the more pastures you can have." Porter has divided his ranch into 14 pastures. Each is served by a good water supply, and cattle are never more than a half mile from water on any pasture. Porter rotates grazing to take advantage of seasonal use and to eliminate spot grazing. He estimates that his stocking rate has risen as much as 20 percent without overgrazing any one pasture.

"Grass is the rancher's crop," states Porter. "The rancher harvests his crop with cattle and sells it as beef. How much beef he gets per acre depends a lot on the location of his ponds. Cattle are lazy—they just naturally tend to stay close to water. They overgraze the grass around ponds and hardly touch the grass on the other side of the pasture."

Porter had noticed this problem on his ranch and began his pond-construction program soon after he became a district cooperator. SCS personnel at the Hubbard work unit have worked closely with Porter over the years, giving him technical assistance in his livestock-management program.

"When I worked out my first conservation plan with SCS help, it became evident to me that I was having to group too many pastures simply because there weren't enough ponds," Porter said. "Each time I constructed a pond, I was able to revise my grazing plan."

Elmer Porter comes by his livestock know-how through many years of experience. But success arrived only after much effort. He began farming rented land in this rolling central-Texas community with a pair of mules, a milk cow, and 16 chickens in 1927. Ten years later, he was able to buy his first tract of land—20 acres that were sold for taxes. Today, he owns more than 4,000 acres of pasture and range land.

Porter is well known for his work with minority groups and has inspired many to success through his example and advice. His son, Bernard, is a successful rancher in his own right, and his three daughters are teachers.

Porter is a strong supporter of conservation districts. He is a leader in his community and has served as a church elder for the past 14 years. In 1969 he was winner of the Texas region 5 Comeback Rancher award. He and Mrs. Porter have worked with local 4-H clubs for many years. He has been an active member of that organization for 52 years.

He gets great satisfaction in taking his nine grandchildren fishing. Porter has stocked all his ponds with hatchery fish obtained from the Texas Fish and Wildlife Service. ◆

Elmer Porter plans his ponds for grazing distribution.

Industry take notice: Culpeper has water

Culpeper has water. Fifteen years ago, Culpeper, Va., made an investment in a new lake. The dividends have exceeded all expectations.

Water, or the lack of it, had been Culpeper's basic problem. Frequent shortages caused by droughts had kept new industry from locating in the community. Mountain Run as a water source couldn't meet the demand.

Community leaders in and around Culpeper wanted to keep their young people at home. They knew that industrial and community development could do this, but they found that no industry was interested in a location that did not have a dependable water supply.

When the Watershed Protection and Flood Prevention Act (Public Law 566) was passed by the Congress in 1954, the Culpeper Town Council quickly voted to participate in the program and cosponsored a watershed project with the Culpeper Soil and Water Conservation District.

By L. S. Button, Jr.
State conservation engineer, SCS, Richmond, Va.

The Mountain Run Watershed Project was planned to reduce flooding of valuable agricultural land. The key structure in the project was the multipurpose Mountain Run Lake dam. It was designed to hold back excess floodwater from a part of the watershed and to store 530 acre-feet of water for municipal use in Culpeper. Two single-purpose floodwater-retarding dams also were in the plan, along with land treatment to reduce erosion and siltation of the stream channels and lakes. Construction began in 1958.

The promise of a dependable water supply spurred community development. Construction on a long-needed hospital began almost at the same time as on the Mountain Run dam. The 75-acre lake would furnish the water necessary for the operation of the hospital.

The long-awaited industrial development also began to materialize. Since completion of the lake in 1959, eight industries have located in the community. They have a total investment of $22 million and annual gross sales of $20 million. They provide work for 1,245 people. To the town of Culpeper, which had a population of 5,800 at the time, this was a significant development.

Westinghouse plans to build a $4½ million plant at Culpeper, employing 200 local people. Many other industries have expanded their plants, creating more jobs and a broader tax base. Culpeper is now in a position to choose the industries it wants.

The 1970 census shows that the population of Culpeper County has increased 16½ percent over the 1960 level.

The town sells 1,500 annual permits at $1 each for fishing in Mountain Run Lake. Sailing and picnicking are also popular there. A park, the first in the county, has been developed adjacent to the lake.

In 1966 and again in 1970, about 60 percent of Culpeper's municipal water was used up during drought periods. Adjoining counties suffered from severely limited water supplies, but Culpeper imposed no restrictions on water use. In fact, Culpeper's water was hauled as far as 20 miles to water dairy herds.

All work outlined in the original Mountain Run watershed plan was completed in 1963. At that time, according to projections, development was progressing at such a rate that Mountain Run Lake would provide only a 4-month supply of water for Culpeper by 1975. Another growing problem was severe flooding of high-value commercial property in Mountain Run's flood plain. The original plan provided protection only for agricultural land.

Project sponsors and SCS reevaluated the Mountain Run watershed work plan and amended it to provide two more dams. One will store 1,000 acre-feet of municipal water. The amended plan also provides for protecting Culpeper from the most severe flood likely to occur in a 100-year interval.

The new multipurpose dam is now designed, and construction is scheduled for this spring.

The Mountain Run Project won the Watershed-of-the-Year award in 1961, presented at the National Watershed Congress. In the 10 years since then, Culpeper has really come alive, and its residents look confidently to the 1970's. ♦

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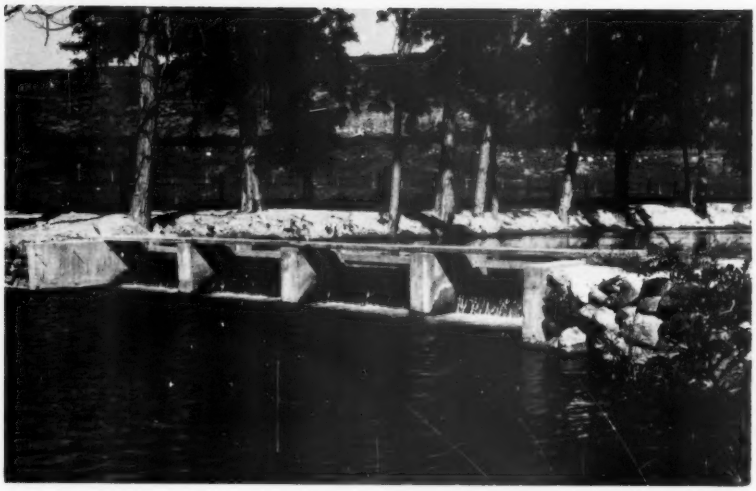


Trout turn a profit on the farm

By Dick Gooby
District conservationist, SCS,
Gooding, Idaho

The prospect of making a living from trout farming did not bring George Talbot to Hagerman, Idaho.

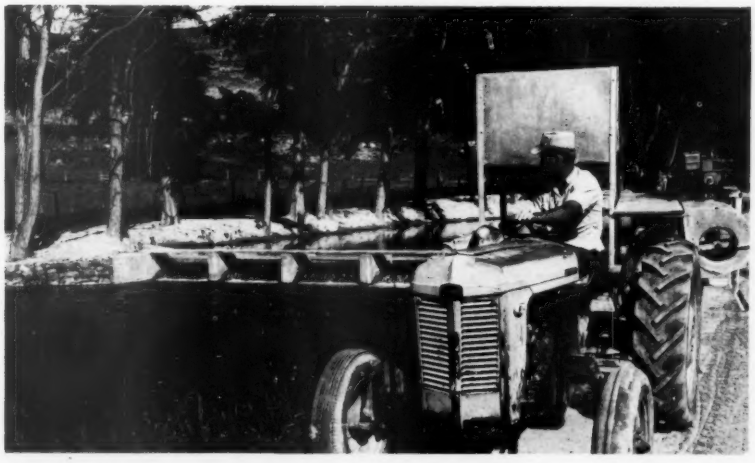
Talbot had been looking for a place to raise his Angus cattle; he wanted a nice climate and plenty of irrigation water. He found both in Gooding County. The Hagerman Valley has a mild climate compared to the surrounding Snake River plains and mountains, and 12 cubic feet of water per second gushes from a spring on the farm that Talbot bought.

The farm was large enough to take care of 80 cows and calves. But after the first summer, Talbot discovered that operating expenses didn't leave much to eat on.

Talbot talked to one of the large commercial rainbow trout growers in Hagerman Valley who was interested in farming out small fish to be raised to market size. The commercial grower furnished the feed and paid $0.10 a pound gain on the fish. All the farmer had to do was furnish the ponds and labor to feed the fish.

Talbot thought the idea had possibilities. He estimated the cost of a pond at $1,600. His next step was to get a bank loan. Then he hired a contractor, and excavation began.

After 2 days, the contractor dug down to what he thought was solid rock. Talbot stopped the work. Trout growers in the area suggested that he contact the Gooding Soil Conservation District and get some



(Top) The structure in the center separates the two ponds and aerates the water. The water is changed twice every hour. (Bottom) George Talbot feeds his trout twice a day with pelleted feed. He made the feeder attached to his tractor at a cost of $300.

professional help before he gave up the project. An inspection of the area by SCS personnel revealed that the rocks were not solid and could be moved easily.

Talbot's original plan called for one large pond, but in planning the project SCS pointed out that there was not enough water for a large pond. Two ponds could utilize the available water more effectively — water would flow from one pond to the other over a drop structure, thus aerating the water.

Talbot went back to his bank. After seeing the plan, the bank loaned Talbot the additional $600 needed for the project.

In planning the project, SCS personnel located another site where two more ponds could be developed at a cost of $3,200.

Talbot constructed these ponds the next winter and now is raising fish in four ponds.

The ponds are stocked with 6-inch rainbow trout, which are harvested when they are about 12 inches long. This takes 4 or 5 months. The ponds are stocked two or three times a year, depending on the size of the fish harvested.

The four ponds produced 70,000 pounds of trout this year; at $0.10 a pound, Talbot grossed $7,000 from the trout. He grossed about $11,000 from his herd of Angus cows. Raising the trout cost $1,780 —labor amounted to $1,080, and the ponds cost $700 a year amortized for 10 years. The cost of keeping the cows is approximately $6,000 a year. Talbot's profits for the year then are approximately $5,220 from the trout enterprise and $5,000 from the livestock enterprise.

The fish facilities take up only 3 acres of land, and after the water runs through the ponds, it is used for irrigation. "Who would have thought that water and land would return more income from fish production than from beef production?" Talbot asks. ♦

Full-season irrigation and recreation too

Dale Boner and Elwin Ross
District conservationist, Maupin, and area engineer, SCS, Bend, Oreg.

A near-perfect lake site, ample water for storage, and five resolute men. These ingredients produced the Pine Hollow Cooperative, which in turn produced a 235-acre lake for irrigation and recreation in the heart of Wasco County, Oreg.— an area where pasture and hay nearly always dried up before summer's end.

In April 1967, the Southern Wasco Soil and Water Conservation District accepted an application from a group of farmers known as the Pine Hollow Cooperative. Bill and Art Peetz, a partnership, Chet and Leo Brittain, another partnership, and Guy Brittain made up the entire membership of the cooperative. They wanted help in developing a storage reservoir to provide water for late-season irrigation.

The Peetz brothers and the Brittains were members of the Badger Improvement District and got irrigation water through a system of canals from Badger Creek and Three Mile Creek. For many years, their district had discussed plans to store off-season flows of the creeks. Slow progress toward this end prompted the formation of the Pine Hollow Cooperative.

The objective was to form a cooperative, get an engineering design and financing, and get the project to the construction stage before seeking more members.

A reservoir site that had been surveyed by the Soil Conservation Service years earlier and turned down by the Badger Improvement District as too costly was given a second look. On this off-stream site, near the center of the Badger District, their canal system would be needed to fill the reservoir and distribute water. Water could come from snowmelt. Data from nearby snow-survey courses and streamflow records showed that enough water was available for storage.

Preliminary geologic studies predicted seepage problems at the dam-site in the pervious zones of the foundation.

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Several townspeople witnessed the first stocking of Pine Hollow Lake by the Oregon State Game Commission.

SCS geologists recommended core drilling to get foundation data for the final embankment design. The Pine Hollow group borrowed $6,000 from a bank; each of the five members cosigned. A core driller was at the site and working in a few weeks. His tests showed that chemical grouting was needed to seal the foundation and thereby reduce water losses to a safe minimum.

SCS completed the design and estimated the project cost at $350,000. The Pine Hollow group obtained $50,521 in cost-sharing through the Rural Environmental Assistance Program of the Agricultural Stabilization and Conservation Service.

They got 55 percent of the construction costs from the Oregon State Game Commission which was interested in potential recreation benefits. The setting among stately pines, the nearness to Portland, and the popularity of small reservoirs gave the area potential. In the final agreement, the Game Commission was to supervise construction and stock the lake. In return, the Pine Hollow Cooperative agreed to public access and use of a 115-acre minimum pool level area.

Wasco County agreed to construct and maintain boat ramps, parking areas, bathroom facilities, and two roads into the lake. In return, the Pine Hollow Cooperative had to purchase and deed to the county the land needed for these developments.

A loan from the Farmers Home Administration left a final cost to the Pine Hollow Cooperative of less than $100,000. Amortized and including maintenance, the annual cost was figured at less than $3 an acre-foot of water.

Construction on the project began on October 7, 1968, 2 years after the Pine Hollow Cooperative was formed. When membership was opened, all landowners in the Badger Improvement District applied.

Art Peetz, secretary and treasurer of the cooperative, kept a record of the activities during the 2-year period. According to him, the five corporation members spent 400 man-days in putting the project together. They had to contact more than 100 individuals.

About three-fourths of the stored water will be available for supplemental irrigation of grain, hay, pasture, and some mint on more than 3,000 acres. The remainder will stay in the lake to insure good fishing.

Economic returns from the project are estimated at $250,000 from recreational use and $100,000 from increased farm production. Not included in this estimate is a long-term return to landowners from selling or leasing nearby lots for summer homes.

What has this project done for this small rural community? Bill Peetz summarizes it saying, "It gave us full-season irrigation this year and much better use of our normal creek flow. This year we had a full second and third cutting of hay. This third cutting alone paid our entire year's water bill." Farmers are buying more irrigation pipe, and people coming to the area for recreation are buying more groceries, gasoline, and fishing supplies from local businesses.

The Dalles Chamber of Commerce in January 1970 gave its Farmer-of-the-Year Award to the five directors of the Pine Hollow Project, and the Oregon Chapter of the Soil Conservation Society of America recognized them with an award for putting together this half-million dollar, multipurpose, water-storage project. ♦

Face lift for Frye Lake

Thirty years of wear and tear have left Frye Lake in bad shape. But a rejuvenation project is already underway, and by late summer this year Frye Lake should emerge anew among the pines of Wyoming's Shoshone National Forest to serve many community needs.

Frye Lake was built in 1941 along the loop road between Lander and historic South Pass City on the eastern slope of the Wind River Mountains. The reservoir was constructed to provide late-season irrigation water for 3,900 acres in the valley below.

Improvements to the lake include 36,000 cubic yards of earthfill, 30 cubic yards of reinforced concrete in the outlet structure, and 5,000 cubic yards of rock riprap on the face of the dam to prevent erosion. Disturbed areas around the dam will be reseeded to native grasses.

The old lake contained only a small pool of water after the irrigation season. The enlarged lake will hold 1,700 acre-feet of water for many uses. This new lake will provide adequate winter habitat for fish. The Wyoming Game and Fish Department has planned a fisheries program to improve year-round trout fishing at the lake.

The Frye Lake improvement project has been helped and accelerated by community interest and the cooperation between federal and state agencies and private groups, including the Popo-Agie Conservation District, the Fremont County Agricultural Stabilization and Conservation Service, the Soil Conservation Service, and the Forest Service.—ROY H. BUCHMEIER, *district conservationist, SCS, Lander, Wyo.* ♦

A tale of two dams

By Edgar Baumann
District conservationist, SCS,
Pendleton, Oreg.

Picture two irrigation projects a few miles apart: One still going and relatively free of silt after 4 decades; the other, long ago put out of operation by silt.

Three miles south of Pendleton in eastern Oregon is McKay Reservoir, built by the Bureau of Reclamation in the early 1920's to supply supplemental irrigation water to 18,000 acres. It was constructed on McKay Creek, a tributary of the Umatilla River.

In 44 years, little sediment has accumulated in the reservoir.

Six miles west of Pendleton, near Rieth, is the barely recognizable remnant of another irrigation project —the Furnish-Coe Reservoir constructed in 1909 on the Umatilla River.

Mrs. Frank Sloan of Stanfield says it took only 5 years for that reservoir to fill with sediment and become useless for irrigation.

What made the difference?—land treatment. In the McKay Reservoir watershed, where sudden storms are frequent, only about 12,000 acres out of about 119,000 is in cropland. Most of that is under conservation plans with the Southern Umatilla Soil and Water Conservation District aided by SCS. The district also works with the Bureau of Indian Affairs on many acres of cropland. Range and woodland management plans are in effect on most of the remaining 107,000 acres.

McKay Reservoir stores 72,800 acre-feet of water behind an earthfill dam that is 2,700 feet long and 167 feet high.

The Furnish-Coe Reservoir had more than 1,000 acres under irrigation growing grain, potatoes, melons, and other crops. There was no thought of treating land above the dam to hold topsoil in place and out of the reservoir. Thousands of acres of dry cropland in the watershed were unprotected from sudden, violent, flood-causing storms.

The dam was blown open in the early 1930's by the Union Pacific Railroad because the silt-filled reservoir was backing water up and flooding a nearby tunnel.

Remnants of the dam can still be seen today, and in what was the reservoir area alfalfa is growing on some of the finest soil in Umatilla County—topsoil washed down from upstream areas more than 35 years ago.

Irrigation water from McKay Reservoir permits a better use of land and a more stable crop pattern. Instead of losing both topsoil and reservoir, people in the area are getting a bigger crop and more income from their land. ♦

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Public utility planning protects resources

Cooperation between sponsors of the Lumberjack Resource Conservation and Development Project and public utility companies in planning regional transmission lines in Wisconsin has made both sides winners—local resources are protected and costs for utility company rights-of-way are decreased.

But this happy ending had a somewhat unhappy beginning when a utility company started negotiating for easements and rights-of-way for a natural gas pipeline through prime forest and recreation lands in Marinette County, Wis.

John Blachowiak, a board member of the Marinette County Conservation District and a director of the Lumberjack RC&D Project, said: "Our forestry committee questioned the wisdom of the proposed route because several miles away a 150-foot electric utility transmission right-of-way ran generally parallel to the proposed pipeline. We didn't want to impede progress, but also we didn't want to destroy our natural resources for a second right-of-way."

The utility company had stated that it would not be feasible for the proposed pipeline and the high-voltage transmission line to share the same right-of-way.

Then negotiations began and brought about the following decision: The proposed gas pipeline was to run along the edge of the existing high-voltage transmission line right-of-way for about 10 miles, thus making it necessary to cut only a part of the timberland.

The decision itself is significant, but so is the fact that the utility companies and county officials cooperated and compromised on such an issue.

"This is the first effort of this kind in our area," commented Rex Taylor, Utility Liaison Committee chairman, Badger Chapter of the American Right-of-Way Association. "We welcome this opportunity to meet with local government and conservation people in evaluating what natural and manmade features in the landscape should be protected in locating transmission rights-of-way."

The directors of the Lumberjack RC&D Project named a committee to promote such cooperation throughout the 10-county project area; the Northeastern Wisconsin Regional Planning Commission voted its support.

As a result of meetings between Blachowiak and Ronald C. Buttke, Wisconsin Public Service Corp., representing the Utility Liaison Committee, each Lumberjack RC&D director was asked to encourage his County Board of Supervisors to designate a person to serve as liaison for right-of-way planning. Counties were asked to start recording on a map features or areas that should be preserved in long-range planning. The Northeastern Wisconsin Regional Planning Commission agreed to help in compiling natural resource data in member counties.

"Establishing a productive working relationship between local government and major public utility companies," says Bernard Stodola, Lumberjack RC&D president, "fits right in with the purpose and goals of our Resource Conservation and Development Project."—ROMAN A. STATZ, *RC&D Project coordinator, SCS, Antego, Wis.* ♦

Within 5 years, sediment filled the Furnish-Coe Reservoir and made it useless for irrigation. Today, only remnants of the concrete dam remain. (Top, left) In 44 years, little sediment has accumulated in McKay Reservoir, shown here at about half its capacity of 72,800 acre-feet of water.

Manmade lakes

Generally speaking a region's needs for fresh water have to be met from its own supplies; there can be a serious shortage in one part of the country while elsewhere large quantities are flowing unused to the sea.

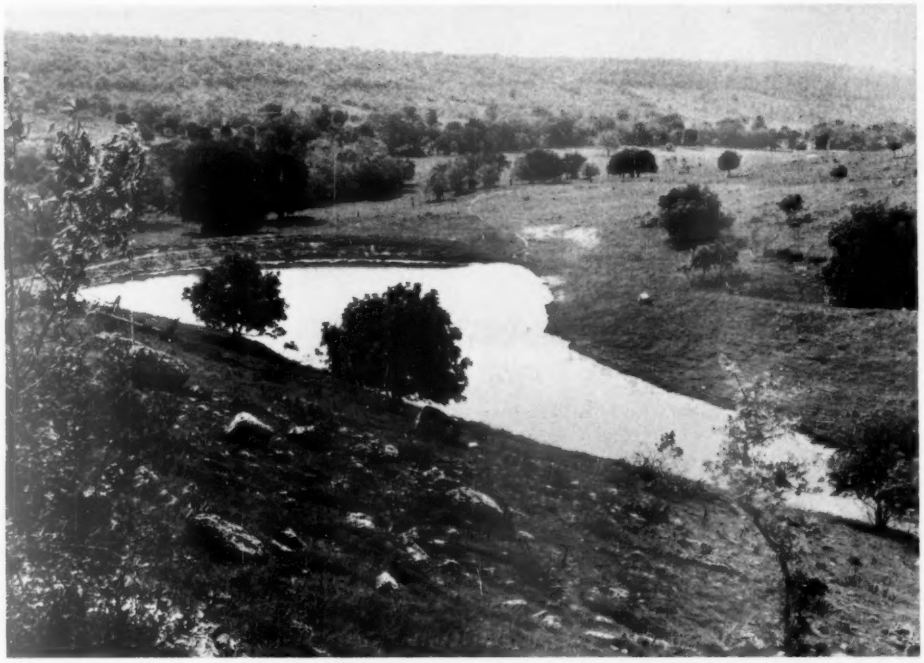
Some areas of the country have concentrated supplies of water gathered in natural lakes or in underground aquifers. But in most areas, manmade surface reservoirs make up the water supply. These reservoirs, which essentially are manmade lakes, have generally been considered as the best means of compensating for natural variations in streamflow.

Manmade lakes range from small farm ponds used for watering livestock to the large multiple-purpose reservoirs used for domestic and industrial water supply, flood control, and recreation.

There are more than 1.7 million ponds or lakes in the United States that were built to hold water for

(Below) Livestock ponds promote better grazing distribution, which means more forage for livestock and wildlife. (Right, top) If soil material is not available or is not suitable for construction, a rock masonry dam can be built where there is solid rock on the sides and bottom. (Right, bottom) This manmade lake attracts wild turkey as well as sheep.

By J. C. Ward
Area engineer, SCS, Fredericksburg, Tex.



This manmade lake provides water for livestock. The area around the lake has been cleared of heavy brush, and rangeland management has brought back a good grass cover.

livestock, irrigation, wildlife, or recreation. Some of these are in areas where there had been little or no fishing or other water-based recreation for miles around.

Regardless of their use, these ponds or lakes have to be well designed and constructed. A well-designed structure can provide an adequate water supply for 25 to 50 years at an annual cost of about $0.15 to $0.25 an acre of pasture. A poorly designed structure may provide water for only one season or 1 year and can cost $4 to $8 an acre for 1 year.

In selecting a site for a manmade lake, consider the following:

(1) The water-tightness of the proposed reservoir area, suitability of the foundation material for the dam and appurtenant structures, and suitability of the soil material for construction.

(2) Depth of storage area. It must be deep enough to compensate for minor seepage loss, evaporation, and drought.

(3) The quality of the water for storage. Water for livestock or wildlife must be free of polluting or poisoning agents.

(4) A proper balance between drainage area and storage area. Generally, a few small lakes in small drainage areas are more practical, economical, and feasible than one lake in a large drainage area. A drainage area should be large enough to provide the minimum supply of water needed for year-round or seasonal use; it should have a good grass cover and a minimum of silt-producing areas.

(5) A properly designed or natural spillway to handle the estimated runoff from a 25-, 50-, or 100-year frequency rainfall, depending on the design frequency used.

(6) Cost-return benefits.

SCS personnel can help select a lake site to fit the needs and give technical assistance with design and construction of the structure. ♦

XUM

Turquoise Trail— an open-ended dream

By Dick Barber
District conservationist, SCS,
Bernalillo, N. Mex.

Seven years ago the Attmore family said auf wiedersehen to military life in West Germany and purchased a 9-acre farm in the village of Llanito, near Bernalillo, New Mex.

Chuck and his wife Toni wanted something more than army-post life for their children, Suzi and John, and themselves. "Turquoise Trail," as they call their farm, dates back to 1701. Toward the east are the lofty crags of Sandia Mountain and to the west the Rio Grande winds its way through the valley. The charming adobe hacienda in which they live is over 100 years old; from 1880 to 1915 it was used as a dance hall. The opening used for a ticket window is now a fireplace. The previous owner installed windows in the 3-foot-thick walls, put in a well and a windmill, leveled the farmland, and built irrigation ditches to take water from the community irrigation canal flowing through the property.

But the farm and house were only part of the dream. Another part came about last September when irrigation water flowed through 650 feet of a newly installed concrete irrigation ditch. The Attmores, as cooperators with the Sandoval Soil and Water Conservation District, have received help from the Soil Conservation Service in conserving and developing their land. They are planning a sprinkler system to irrigate the high land and an irrigation well to provide clean water free of weed seeds.

Chuck still is an Army lieutenant colonel, so his wife manages the farm with the help of her uncle, Ed Snyder. Snyder stopped by Turquoise Trail in 1968 on his way to Mexico where he planned to settle down and write fiction. He never finished his journey. He and Toni already have more than an acre in herbs, vegetables, and nuts. Some of the herbs are anise, caraway, marjoram, mint, oregano, sage, and tansy; vegetables are Chinese snowpeas, yardlong beans, kohlrabi, cheffini, celeriac, garlic, leeks, French carrots, corn, and chuffa nuts; and the almond and pecan orchard is just beginning to bear. They have some other exotic plants to try on their list.

"We will grow anything people will buy," says Toni, "as long as it is legal and we can get the planting stock or seed. We want to specialize in the unusual. We are supplying specialty foods to Chinese, German, and Dutch restaurants and delicatessens in Albuquerque."

Toni and Uncle Ed also believe in organic gardening. They put sawdust, chopped cornstalks, weeds, and other organic matter through a compost process. They prize earthworms and use insect spray only on corn. Chopped onion, garlic, and coriander tops are used to repel insects.

"Most of our soil is heavy clay," Uncle Ed says. "When dry it is hard as a brick, and it takes water slowly. I have to use a small stream in each row to allow time for soaking. If we ever get enough organic matter into our soil, it will soak up water faster."

The rest of the dream? Toni hopes to build an arts and crafts center and sell weaving, art metal work, mosaics, and ceramics. Chuck, after military retirement, plans to start an import business using the center as an outlet for items such as fine metals and gourmet supplies.

But the dream is open-ended. It is constantly being modified. There have been disappointments and plenty of sore muscles, but they are more than compensated for by the Attmores' satisfaction of making use of a small portion of the good earth. ♦

The hacienda at Turquoise Trail enjoyed by Toni Attmore (left) and Uncle Ed Snyder.

New twists to terraces

In Sheridan and Decatur counties in northwestern Kansas, farmers are shifting to new types of terraces where soil and terrain permit.

In that area, as in most of the Great Plains, good farming requires greater conservation effort in checking soil erosion, slowing the rate of runoff, and making better use of moisture.

Harold Lohoefener and his son, Jerry, who farm in the Decatur County Soil Conservation District, installed more than 5 miles of flat-channel terraces on 231 acres in 1966. The flat channels are 54 to 64 feet wide; there is a low, gently sloping dike 1½ feet high and 25 feet wide at the lower side of each terrace.

"Rain that collects in the channels spreads over a wide area and readily soaks into the ground," Jerry Lohoefener explained. "The water benefits the crop rather than drowns it as sometimes happens on conventional terraces in this area.

The Lohoefeners reported that in the fall of 1968 two rains of about 3 inches each caused overtopping and some damage to conventional terraces. But on the flat-channel terraces the water soaked into the soil in 48 hours.

"Regular terraces stay wet longer than flat-channel terraces," says Jerry Lohoefener, "so harvesting is easier on the new terraces, and our big machinery works better on them because of the gentle front and back slopes."

Crop yields are reduced the first

Corn can grow on this field without irrigation because the flat-channel terraces hold more moisture than other terraces.

The white tape and the rod held by the farmer give an indication of the slope of this level parallel terrace.

few years where deep cuts are needed for the wide channels. But there is more blending of topsoil into cut areas on these terraces than in the extensive cuts made in land leveling for irrigation.

The short, extra point rows that occur when crops are planted in contoured parallel rows between nonparallel terraces are fewer with flat-channel terraces. And fewer terraces are needed in a field; thus, there are fewer terrace intervals where point rows can occur.

"We believe that the flat-channel terraces are well worth the extra cost," Jerry Lohoefener said. The Great Plains Conservation Program made it possible for them to go ahead with the new terraces.

Another type of terrace that is gaining favor in western Kansas is the level parallel terrace.

Sheridan County farmland has long, even slopes that make this type of terrace practical. Level parallel terraces in Kansas are limited to semiarid areas of permeable soils where holding water on the land helps to increase the ground-water supply as well as to control erosion. On less permeable soils and in areas of higher rainfall, graded parallel terraces can be used.

Parallel terraces eliminate point rows, speed up farming operations, help to control erosion, and make maximum use of rainfall.

In spring 1969, Murray Custer, a cooperator with the Sheridan County Soil Conservation District, built 3,741 feet of level parallel terraces on 63 acres. The cost was no greater than for conventional terraces.

Cuts and fills on the long, even slopes of 0.8 to 1 percent were made with a paddle wagon. Soil was elevated first to the ridge from the upper side with an elevating terracer or grader and then into the terrace channel; a motor grader was used to smooth out the terraces. The terrace channels are 35 to 40 feet wide and 300 feet apart. An occasional nonparallel terrace was needed to bring the terracing back to a cross-slope orientation to avoid excessive excavation.

Custer's terraces are designed so that 90 percent of a 6-inch rain can be absorbed into the soil.

"The field farms a lot better since it was parallel terraced," Custer reported. "It's easier to operate equipment where terraces are parallel."

Custer uses a wheat and summer-fallow rotation on his parallel terraced fields.

The terrace system was designed and laid out by the Soil Conservation Service. Custer received cost-sharing from the Rural Environmental Assistance Program.—JOHN C. DARK AND W. DALE YOUNKIN, *district conservationists, SCS, Oberlin and Hoxie, Kans.* ♦

Conservation in action . . .

Something for everyone

"Something for Everyone" is the motto of a 500-acre recreation complex that stretches along the shoreline of Tennessee's Center Hill Reservoir.

The motto probably has deeper meaning than the developers realized when they picked it, for the development has brought something for everyone in the area—scenic beauty, recreation, an improved economy.

Aaron Durham, president of Land Developers of Four Seasons of Tennessee, gives much credit for the success of the development to conservation organizations.

W. R. Lassiter, DeKalb Soil Conservation District chairman, said, "These developers realize that conservation is as necessary on a recreation area as on cropland, pastures, or woodland. At their request we provided planning assistance and other help that is available through the Soil Conservation Service."

SCS helped locate soils suitable for septic-tank absorption fields in areas set aside for houses. SCS also helped find stable soils for scenic drives and horseback-riding trails.

A critical area that was not left unprotected.

The roads and trails wind through stands of beautiful southern hardwoods that frame scenic views of the lake. An effort was made to save beautiful trees, especially redbuds, dogwoods, and other flowering species.

"By following the advice of SCS specialists," claims Durham, "we were able to establish a good cover of grass on unprotected areas, including roadbanks and steep places around the marina."

Facilities of the Four Seasons of Tennessee development include a championship golf course, lighted tennis courts, a marina with complete boating and fishing facilities, a lodge and restaurant, indoor and outdoor swimming pools, a 100-room inn, a stable and training center for Tennessee walking horses, a show arena, and 6 miles of riding trails.

"The green carpets of grass have been a strong selling point in our development," Durham stated, "and the grass and other conservation measures that we applied have prevented tons of soil from washing into Center Hill Lake."

"Four Seasons has improved the economy as well as the environment of our entire county," said Bob Ridner, a director of the Hull-York Lakeland Resource Conservation and Development Association and secretary of the Chamber of Commerce of DeKalb County. DeKalb is one of 11 counties in the Hull-York RC&D Project area. The Hull-York Association is promoting the conversion of submarginal agricultural lands to recreation and other uses.—NEIL DUDNEY, *district conservationist, SCS, Smithville, Tenn.*

Learning irrigation at Lincoln

Irrigation is a fast growing industry, and heavy enrollment in an irrigation course at the SCS Midwest Training Center, Lincoln, Nebr., bears this out.

The water-management course draws people from throughout the United States and from foreign countries. SCS employees as well as other government people can take the 2-week course, which has been improved and expanded since it was started in 1962. Those completing the course should be able to help a landowner test his irrigation system to determine if he's making the best possible use of his water.

Lincoln is one of two SCS training centers offering the course.

Lincoln's course has its own outdoor laboratory. In 1965, the University of Nebraska agreed to let SCS use 8 acres of its field laboratory at Mead. SCS designed, staked, and paid for necessary structures; the university paid for land leveling and a waterway. The university plants and harvests the crops and supplies water.

After a week in the classroom, students move out to the field laboratory. There they measure the effectiveness of various irrigation systems; they determine soil moisture, water pressure, and land slope and gather other pertinent data, just as they would for a landowner. They determine how much water is put on a field in a certain length of time (the water can be controlled from a trickle to 1,000 gallons a minute) and measure how much runs off. They then can determine an effective application rate.

Students get a chance to evaluate many different irrigation systems at the field laboratory, including the SCS-installed furrow and border

Marvin Barber (foreground), an instructor at the Midwest Training Center, is regulating the ditch flow. His students are measuring the flow with pendvane and Parshall flume devices.

systems and university sprinkler systems such as the center-pivot and tow-line. They also study re-use systems and various kinds of pipe.

L. F. Joris, head of the SCS Midwest Training Center, and Grant Woodward, SCS irrigation specialist at the center are concerned about the rapid increase in water use and the need to use this resource without waste or undue lowering of quality.

"The East and Midwest do not depend entirely on irrigation to raise crops, but the people there are irrigating more than ever," Woodward says. In fact, these areas are our fastest growing irrigation section. From 1960 to 1969, irrigated acreage increased 96 percent in Michigan, 59 percent in Nebraska, and 140 percent in Wisconsin. These compare to a national average of 35 percent.

According to Woodward, the 1964 projections of 50 million irrigated acres in the United States by 1980 have fallen short by almost 10 years. There are nearly that many irrigated acres in the United States today.

The training course has served and will continue to serve people from arid regions where irrigation has long been practiced, but Woodward and Joris both feel that the course takes on new value for the newcomers in irrigation. — LYNN BETTS, *information specialist, SCS, Lincoln Nebr.* ♦

(Right) Students using a pitot tube to measure the pressure of water coming through a sprinkler nozzle. (Below) Students using a Parshall flume device to measure the flow of water from a canal gate into a bordered field.

Log cabin revival

Many trees suitable for the construction of log cabins are maturing on more than 50,000 acres in New York. The trees are in state-owned plantations in the South Central New York Resource Conservation and Development Project area, which embraces seven counties. There also are cabin-size trees in privately owned plantations covering extensive areas.

Philip C. Comings, chairman of the steering committee of the South Central New York RC&D Project, believes that there is a market for the seven-county area's trees. An RC&D Project objective is to encourage resource-based industry to provide employment and profit for local people.

According to Comings, outdoor recreation has a high potential in all seven counties—Tioga, Cortland, Madison, Broome, Chenango, Otsego, and Delaware. "About 50,000 log cabins—vacation houses, hunting lodges, lodging for campers, or year-round residences—can be built with the area's softwood timber," claims Comings. "A log-cabin industry in the area can provide 5,000 man-years of employment."

Richard Howard, the project's forester, has constructed a model of a log cabin and has prepared plans for factory production of log-cabin parts.

More than 54 firms, wood processors, and potential backers have asked for plans and specifications for the log cabins; one firm has begun production, and another is displaying models of the cabins it will make.—MEREDITH A. PETERS, *state woodland conservationist, Syracuse, N.Y. and* MILO E. THOMPSON, *former project coordinator, SCS, Norwich, N.Y.* ♦

Moon rock tells resource story

A drab-looking moon rock stole the show at the Carter County 4-H Fair in Elizabethton, Tenn. The Carter Soil Conservation District board members featured the rare lunar stone in their booth.

How do moon rocks tie in with conservation? Jess Clark, chairman of the Carter District board, explains it this way: "Without the good earth's life-giving resources man could not have gone to the moon and back."

Actually, the connection is more personal than rocks and conservation might indicate. Astronaut Alan Bean, the fourth man to walk on the moon, is the son of retired Soil Conservation Service employee Arnold H. Bean. The senior Bean retired as watershed planning specialist in 1965.

The Carter District board was hard pressed to acquire the moon sample. There are some 1,500 requests to exhibit samples of the moon rock. The Carter District, through its representative in Congress, made arrangements with NASA to obtain the sample.

J. B. Holt, who is a cooperator and consultant to the board of supervisors, flew to Washington and picked up the exhibit. NASA required that the 3.2 billion-year-old rock be kept under guard while on display and locked in a vault after exhibit time. The Elizabethton Police Department and the Carter County Sheriff's Department alternated in providing guards.

"This proved to be the most interesting and educational project our district ever attempted," Clark said. "Local interest and response was overwhelming."—JAMES ELDRIDGE, *district conservationist, SCS, Elizabethon, Tenn.* ♦

Meetings . . .

Symposium to be held on manmade lakes

Sponsored by the Scientific Committee on Water Research on behalf of the International Council of Scientific Unions, an international symposium on manmade lakes, their problems and environmental effects will be held May 3-7 in Knoxville, Tenn.

Arrangements in the United States are by the National Academy of Sciences, the Tennessee Valley Authority, and the University of Tennessee.

The symposium will be organized around (1) broad, interdisciplinary case studies of the world's great manmade lakes and collections of lakes, (2) regional summaries and discussion of the conference topics, and (3) visits to TVA projects.

Principal topics include: Manmade lakes of the world; case studies of major lakes; reservoirs as physical systems that include hydrology, meteorology, geophysics, and limnology; reservoirs as biological systems including aquatic and terrestrial ecosystems; reservoirs in relation to man, archaeology, resettlement, agriculture and wildlife, fisheries, health, transportation, and tourism; and management for multiple use.

NCSGC to spotlight creativity

The forty-second annual convention of the National Council of State Garden Clubs will take place May 14-20, Bal Harbour, Fla. It plans to have as its theme, "This World of Creativity."

Topics include: "Creativity and Environment," "Creativity in Youth and Knowledge," and " 'Creativity' Yesterday—Today—Tomorrow."

XUM

Audubon after the ecology generation gap

"Bridging the Ecology Generation Gap" will be the theme of the 66th National Audubon Convention at Milwaukee, Wis., May 20-24.

Programs on May 22 and 23 present "student leaders, the young environmentalists challenging the establishment, who have let the world get on a toboggan."

Solutions to the "complex problems of the polluted Great Lakes—from slightly tainted but threatened Lake Superior to dying Lake Erie" will be sought in a special panel discussion.

Field trips include visits to the geologically and ecologically fascinating Wisconsin Dells, Horicon Marsh, and the North Kettle Moraine.

Dates and places

May 2-8, Clean Waters for America Week.

3-6, Garden Clubs of America, St. Louis, Mo.

3-7, League of Women Voters of the U.S., Washington, D.C.

3-7, International Symposium on Madmade Lakes, Their Problems and Environmental Effects, Knoxville, Tenn. Organized by the Scientific Committee on Water Research (COWAR) on behalf of the International Council Of Scientific Unions (ICSU).

9-12, National Forest Products Association, Washington, D.C.

14-20, National Council of State Garden Clubs, Bal Harbour, Fla.

16-23, Soil Stewardship Week.

20-24, National Audubon Society, Milwaukee, Wis.

23-26, Northeast Conservation Engineers and Northeast Fish and Wildlife Conference, Portland, Maine.

June

6-9, National Watershed Congress, Tampa, Fla.

7-9, American Association for Conservation Information, Springfield, Mo.

13-18, American Water Works Association, Denver, Colo.

14-18, American Water Resources Association and University of Wisconsin-Milwaukee Research Conference on Planning for Water Quality and Standards, Milwaukee, Wis.

19-25, Outdoor Writers Association of America, Inc., Pensacola, Fla.

21-23, American Water Resources Association and Cornell University, Symposium on Social and Economic Aspects of Water Resource Development, Ithaca, N.Y.

26-30, Air Pollution Control Association, Atlantic City, N.J.

27-30, American Seed Trade Association, St. Louis, Mo.

27-30, American Society of Agricultural Engineers, Pullman, Wash.

27-July 2, National Education Association, Detroit, Mich.

27-July 3, National Environmental Health Association, National Watershed Congress, Portland, Oreg. ♦

New publications

100 Native Forage Grasses in 11 Southern States. By Horace L. Leithead, Lewis L. Yarlett, and Thomas N. Shiflet. *1971. USDA Agr. Hbk. 389. 216 pp., illus. $1.* Presents 100 native grasses on the basis of their importance as forage for both domestic and wild animals or as indicator plants of range condition in the states of North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, and Tennessee. It gives the principal parts of a grass plant and native grass management principles; it has detailed drawings and descriptions of the grasses. A reference list and a glossary appear at the end of the book.

Environmental Planning: 1, Environmental Information for Policy Formulation. By Michael J. Meshenberg. *1970. Planning Advisory Service Rpt. 263 (American Soc. Planning Officials, 1313 East Sixtieth Street, Chicago, Ill. 60637). 52 pp., illus. $6.* Presents some of the practices that adversely affect our environment; gives reasons for early analysis and environmental planning; describes the types of information needed to inventory and analyze the natural and cultural or manmade environment; and shows how to use the environmental survey. The Appendix gives excerpts from the Interim Guidelines prepared by the Council on Environmental Quality.

Environmental Planning: 2, A Selected Annotated Bibliography. By Michael J. Meshenberg. *1970. Planning Advisory Service Rpt. 264 (American Soc. Planning Officials, 1313 East Sixtieth Street, Chicago, Ill. 60637). 79 pp., $6.* An annotated, comprehensive list of selected references on the various aspects of environmental planning ranging from general environmental issues and problems, ecology, and population to soil surveys, geology, flood-plain management, and landscape analysis. An annotated list of related periodicals is also included.

Conservation Education, A Selected Bibliography, Supplement. Compiled By Joan Caravajal and Martha E. Munzer. *1971. The Interstate Printers and Publishers, Inc., Danville, Ill. 38 pp.* Brings up to date materials produced since the bibliography was published in 1968 and contains selected titles on interrelationship of resources, natural resources, role of man, and tools for the teachers from among the many published between 1967 and the summer of 1970.

Soils and Septic Tanks. By William H. Bender. *1971. USDA Agr. Inf. Bull. 349. 12 pp., illus. $0.15.* The number of septic-tank disposal systems, in use for several decades in rural areas and suburban communities, has greatly increased in recent years because of rapid expansion in the suburbs. To help the public get a system that can give years of trouble-free service, this bulletin explains the soil factors that affect septic-tank absorption fields. It also explains the need to study a local soil survey and soil map. It presents some pointers in selecting a site.

Water Supply Sources for the Farmstead and Rural Home. *1971. Farmers' Bull. 2237. 18 pp., illus. $0.15.* Outlines water requirements and sources for ground water or surface water for farmstead and rural home water-supply systems.

Soil surveys

Sullivan County, Indiana. By Leo A. Kelley. *1971. 73 pp., illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by Leo A. Kelly, Ralph H. Sturm, Herbert F. Williamson, and James M. Smith.

Franklin County, Arkansas. By Frank M. Vodrazka, Francis H. Stephens, William K. Goddard, and James W. Spotts. *1971. 94 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Carroll and Haralson Counties, Georgia. By J. F. Brooks. *1971. 60 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by J. F. Brooks, T. N. Crabb, and R. D. Wells.

Pemiscot County, Missouri. By Burton L. Brown. *1971. 47 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by Kenneth E. Benham, Burton L. Brown, John P. Francka, Robert J. Held, Billy E. Sparkman, and Gary W. Sturdevant.

Recon . . .

"Environmental control officer" is a new post in Middleton Township, Monmouth County, N.J. The mayor created the position in the police department. The officer, a combination policeman-educator, is responsible for, among other things, "the detection of land erosion."

"The 'dead of winter' in years gone by may have been the period for a slower pace for Soil Conservation Service people in New Hampshire. Not so now-a-days. Servicing the rapidly increasing requests from towns for resource information and planning assistance, prior to March town meetings, makes the long winter days seem all too short. Principal activities of concern to resource planners are new and amended zoning ordinances and subdivision regulations based on actual resource conditions; solid waste disposal; and resource conservation related legislation." — DONALD G. BURBANK, *state conservationist, SCS, New Hampshire.*

California's new water-quality law (Porter-Cologne Water-Quality Control Act) expands the definition of "beneficial uses" of state waters to include preservation and enhancement of fish and wildlife as well as esthetic enjoyment of water. Enforcement (including fines of up to $6,000 a day) may curb polluting practices not traditionally considered within the scope of water-pollution control. For example, action is being taken to prevent damage caused by erosion and siltation resulting from subdivision development.

Absentee landlords in Ohio's Buckeye Hills Resource Conservation and Development Project area were so interested in its conservation services that a spring tree-planting program was organized in response. "Plant a million" was the objective of the campaign recently completed under the technical leadership of RC&D Project Forester John Young, a state employee. Private contractors planted hundreds of thousands of white pines by machine and by hand on private land. By matching their purchases, tree for tree, the West Virginia Pulp and Paper Company encouraged landowners to invest in future forests. REAP cost-sharing on tree costs also boosted interest in the project. "This former cropland," said Paul Dodd, SCS project coordinator, "will have higher-valued tree stands sooner than if left to improve via natural plant succession. The trees also help control erosion on sloping land in Belmont, Noble, Monroe, Morgan, and Washington counties."

Rhode Island residents have an "environmental bill of rights." As amended an original constitutional clause guaranteeing fishing and beach access rights to the people asks due regard for preserving the value of these rights. The state general assembly is now responsible for adequate planning to conserve natural resources.

A rural township in Pennsylvania went to court to keep its character and lost the case, *Farm Journal* reports. The Pennsylvania Supreme Court recently ruled against the township's zoning ordinance that required homesites of at least 2 acres. Local officials had protested that anything smaller would mean an eventual strain on community facilities, but judges said that the township could no longer "use restrictive zoning merely to avoid dealing with urban growth."

Residents of Rockingham County, Va., recently rallied 'round a radio station to wage war on a local pollution problem. Burning tires had blackened skies within a 15-mile radius of the Harrisonburg city dump on many a morning until radio personalities at Station WSVA encouraged listeners to contact local officials personally to demand an end to the recurring atmospheric eyesore. Within a week, the Harrisonburg city council ordered total enforcement of antiburning ordinances. Within a month, the county board of supervisors prohibited commercial dumping of tires at county dumps.

In Louisville, Ky., more than 98,000 essays on "Water Pollution—Its Effect on My Community" were submitted to *The Louisville Courier-Journal* during its statewide conservation essay contest. Sponsors, although pleased by the record participation, are concerned with the educational value of the annual exercise.

An "oil-eating" microorganism mixture has been successfully used to clean up trial oil spills in the Potomac River estuary, the Wildlife Management Institute reports. "Petrodeg"—a mixture of marine and terrestrial organisms and chemical nutrients—is being tested by its creator, Bioteknika International, Inc., of Alexandria, Va. In 4 days hungry microbes converted a 100-square-foot oil blotch to carbon dioxide, water, sugars, and proteins.

Six or more attorneys general are to man Pennsylvania's recently created "Pollution Strike Force." Their sole responsibility is prompt enforcement of existing laws in support of the state's intensified antipollution drive.

XUM

From the Administrator:

Better dams for better lakes

Designing dams and reservoirs—for one use or many—calls for blending the professional skills from many disciplines. It takes engineering and sedimentation geologists, hydrologists, hydraulic structure specialists, structural engineers, soil mechanics engineers, construction engineers, recreation specialists, biologists, economists, and planning specialists.

It calls for mixing the science of dam-building with the wishes and needs of citizens and communities who sponsor or will be affected by the project.

The outstanding success of the Soil Conservation Service in helping build manmade lakes is due largely to this integrated approach to design and construction and to the efforts of SCS specialists.

And SCS has become a major builder of dams through hundreds of watershed projects under Public Law 566 and earlier acts. Most are single-purpose flood-prevention structures, but more and more are being built to serve other uses as well —to store water for recreation, for supplying homes and businesses, for irrigation, for livestock, for fire fighting.

Because of growing water-storage needs, watershed dams continue to increase in height, as does the size of the area contributing runoff to the reservoir. We have had to take a fresh look at SCS design criteria that were developed for small dams on small watersheds.

One need is to design earth emergency spillways so that during heavy storms the volume of runoff, and velocity and duration of flow, are not increased beyond comparable values for smaller dams. For dams having a watershed of 5 to 10 square miles, our present design criteria are adequate.

Using earth emergency spillways on watershed dams instead of the conventional concrete spillways has saved millions of dollars. We will continue to use them wherever they are practical and economical. Where the watershed is large or where dams are in series, auxiliary mechanical emergency spillways of durable materials such as concrete may be needed. The crest of a mechanical spillway has to be lower than that of an earth spillway to keep discharge through the earth spillway within tolerable limits.

We must remain flexible to meet changing conditions. We must seek out, develop, and apply improvements in design theory and practice, materials of construction, construction equipment and technique, foundation exploration equipment and technique, and other methods that lead to technical excellence in performance.

It is part of the SCS aim to maintain a sound technical base for all of our operations.

Kenneth E. Grant

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Fishing in a farm pond

If your favorite fishing stream has been ruined by too many fishermen, try a farm pond. Many farm ponds that were built primarily to supply additional irrigation water have been stocked with fish and opened to the public. These private ponds are relieving the overcrowding on many streams and lakes.

In the past 10 years more than 400 fish ponds have been built by farmers in the Uintah Basin Soil Conservation District in Utah. The ponds range from less than 1 surface acre to 1,300 surface acres. The Soil Conservation Service has helped with the technical planning of these ponds. The Bureau of Sport Fisheries and Wildlife has furnished rainbow trout for stocking. Many farmers have stocked their ponds with fish from private hatcheries.

The Uintah Basin is bordered by the high Uintah Mountains on the north and the wild and rugged Book Cliffs on the south. Every year thousands of people come to hunt, fish, sightsee, or just relax in this beautiful eastern Utah area.

You fight the fish, not the crowds on private fish ponds in the Uintah Basin.

It is estimated that private fish ponds in the Uintah Basin are visited by more than 5,600 people each year.

Grant Hansen, a district cooperator from Altamont, estimated that more than 300 visitors fished in his 18 stocked ponds last year. "Families from the city camp the entire weekend at my ponds," Hansen said. And District Supervisor DeVon McKee from Tridell stated, "It's not uncommon to see three or four campers at a time parked by one of my ponds."

Some pond owners ask only that visitors respect property: ask for permission to fish; do not damage or destroy property; leave it clean; and close the gates. But many consider fish ponds as a source of income. For a small fee, a family can enjoy a nice outing where there's plenty of fish and lots of privacy. Membership in a sports club may be required for fishing in some private ponds. Some private ponds are open the year-round.—MARK M. PETERSEN., *district conservationist, Randolph, Utah.* ♦

XUM